



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/663,807

09/17/2003

Eiji Hayashi

Q77558

4057

65565 7590 05/07/2009
SUGHRUE-265550
2100 PENNSYLVANIA AVE. NW
WASHINGTON, DC 20037-3213

EXAMINER

BOES, TERENCE

ART UNIT

PAPER NUMBER

3656

MAIL DATE

DELIVERY MODE

05/07/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/663,807	Applicant(s) HAYASHI, EIJI	
	Examiner TERENCE BOES	Art Unit 3656	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15, 23, 28, 29 and 33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15, 23, 28, 29 and 33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09/17/2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Request for Continued Examination

1. The request filed on 01/12/2009 for a Continued Examination (RCE) is accepted and a continued prosecution application has been established. An action on the RCE follows.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the tube guide insertion hole is a through hole which penetrates the nut, and wherein an entire depth of the tube guide insertion hole has an equal cross-section must be shown or the feature(s) canceled from the claim(s). See further discussion in 35 USC 112 section below. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an

Art Unit: 3656

application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-15, 28, 29, 23 and 33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 11 recite "the tube guide insertion hole is a through hole which penetrates the nut, and wherein an entire depth of the tube guide insertion hole has an equal cross-section", rendering the claims indefinite. The recitation does not appear to be supported by the original disclosure. While applicants' figures 1 and 3 appear to support the recitation, it is noted that these views are two dimensional in nature and do not provide a complete picture of the recited "through hole". A view taken from an axial perspective reveals that hole 9 is not a "through" hole in that the hole must terminate at a surface on the nut. Further, the hole cannot have an "equal cross-section" as the threaded shaft passing through the nut does not allow for this. See for example applicant's figure 4D, showing an axial cross-section, which shows the **nonequal** cross-section of tube guide 10 corresponding to a **nonequal** cross-section of the claimed

Art Unit: 3656

hole. It is further noted that for clarity, the rejection was explained to applicants' representative, Blake Tankersley, on 5/5/09.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-3, 7, 8, 9, 11-13, 15, 28, 29, 32, and 33, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 4-116051 in view of Rohlinger US 5,373,755.

JP 4-116051 discloses:

- a screw shaft (1) including a spiral-shaped ball rolling groove (1a) formed in an outer peripheral surface thereof;
- a nut (2) including a spiral-shaped ball rolling groove formed in an inner peripheral surface thereof;
- a plurality of balls (3) disposed in a ball rolling passage formed by the two ball rolling grooves;
- a ball circulation tube (5) forming a ball circulation passage and including a ball scooping portion (5a) in an end portion thereof,
- a tube guide insertion hole (2c) is formed on the nut at a position where the ball scooping portion is inserted,

Art Unit: 3656

- a tube guide made of resin (7, also see Japanese rejection) via which the ball circulation tube is mounted onto the nut.
- the tube guide (7) comprising: a top surface; a bottom surface; and a side surface connecting the top surface and the bottom surface (see figure 3, tube guide 7 has top and bottom surfaces and a cylindrical side surface),
- wherein a scooping portion insertion hole is formed so as to penetrate from the top surface to the bottom surface (see figure 3),
- the ball scooping portion is inserted into the scooping portion insertion hole (see figure 3),
- a tube guide insertion hole is formed on the nut at a position where the ball scooping is inserted (see figure 3).
- the side surface has a shape matched to an inner shape of a tube guide insertion hole (see figure 3),
- the scooping portion insertion hole has an inner shape matched to an outer shape of the ball scooping portion (see figure 3).
- wherein the side surface is formed in a cylindrical shape (see figures 1 and 3)
- wherein an axial line of the cylindrical shape is set perpendicular to an axial line of the nut (see figures 2 and 3)
- wherein the tube guide is made of elastic material (because all materials have a modulus of elasticity, the tube guide is made of an elastic material).

Art Unit: 3656

- wherein the tube guide is interposed between the ball scooping portion and the tube guide insertion hole without any clearance between the ball scooping portion and the tube guide insertion hole (see figure 3).
- Wherein the top surface is chamfered in a smooth arc manner (see figure 3, top surface is curved matching shape of radius in tube)
- Wherein the top surface of the tube guide and the installation surface are disposed on a same plane on both sides of the tube guide (see top surfaces of 2b and 2c in same plane)

JP 4-116051 discloses a ballscrew with a recirculation tube guide. JP 4-116051 does not disclose an installation surface on which a lower surface of the ball circulation tube contacts. Rohlinger teaches an installation surface on which a lower surface of the ball circulation tube contacts (see figures 3 and 4). Because both JP 4-116051 and Rohlinger teach ballscrews with recirculation tube tube guides, it would have been obvious to one having ordinary skill in the art at the time of the invention to provide an installation surface on which a lower surface of the ball circulation tube contacts to achieve the predictable result of recirculating balls within a ballscrew.

2. Claims 1-3, 7- 9, 11-13, 15, 30 and 31, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Conant 2,882,742 in view of Merkel US 3,379,643.

Conant discloses:

Art Unit: 3656

- a screw shaft (10) including a spiral-shaped ball rolling groove (11) formed in an outer peripheral surface thereof;
- a nut (12) including a spiral-shaped ball rolling groove (13) formed in an inner peripheral surface thereof;
- a plurality of balls (16) disposed in a ball rolling passage formed by the two ball rolling grooves;
- a ball circulation tube (17) forming a ball circulation passage and including a ball scooping portion in an end portion thereof,
- a tube guide insertion hole is formed on the nut at a position where the ball scooping portion is inserted (see figure 6),
- a tube guide (35) via which the ball circulation tube is mounted onto the nut.
- the tube guide (35) comprising: a top surface; a bottom surface; and a side surface connecting the top surface and the bottom surface (see figure 6),
- wherein a scooping portion insertion hole is formed so as to penetrate from the top surface to the bottom surface (see figure 6),
- the ball scooping portion is inserted into the scooping portion insertion hole (see figure 6),
- a tube guide insertion hole is formed on the nut at a position where the ball scooping is inserted.

Art Unit: 3656

- the side surface has a shape matched to an inner shape of a tube guide insertion hole (see figure 6),
- the scooping portion insertion hole has an inner shape matched to an outer shape of the ball scooping portion (see figure 6).
- wherein the side surface is formed in a cylindrical shape (see figure 6)
- wherein an axial line of the cylindrical shape is set perpendicular to an axial line of the nut (see figure 6)
- wherein the tube guide is made of elastic material (because all materials have a modulus of elasticity, the tube guide is made of an elastic material).
- wherein the tube guide is interposed between the ball scooping portion and the tube guide insertion hole without any clearance between the ball scooping portion and the tube guide insertion hole (see figure 6).

Conant does not disclose resin.

Merkel teaches resin (C1/L24-35) for the purpose of increasing flexibility and magnetic strength while reducing the expense of rigid metallic magnets (C1/L24-35).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the teachings of Conant and provide a magnetic resin, as taught by Merkel, for the purpose of increasing flexibility and magnetic strength while reducing the expense of rigid metallic magnets.

Art Unit: 3656

3. Claims 4-6, 10 and 14, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 4-116051 in view of Rohlinger US 5,373,755 and further in view of Ebina et al. US 6,089,117.

JP 4-116051 in view of Rohlinger discloses all of the claimed subject matter as described above. JP 4-116051 in view of Rohlinger does not disclose wherein the scooping portion insertion hole has a ball circulation passage scooping angle set so as to correspond to the a lead angle of the ball screw.

Ebina et al. teach wherein the scooping portion insertion hole has a ball circulation passage scooping angle set so as to correspond to the a lead angle of a ball screw (see figure 8) for the purpose of achieving smooth circulation of balls (C16/L45-60).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the teachings of JP 4-116051 in view of Rohlinger and provide wherein the scooping portion insertion hole has a ball circulation passage scooping angle set so as to correspond to the a lead angle of a ball screw, as taught by Ebina et al., for the purpose of achieving smooth circulation of balls.

JP 4-116051 further discloses:

- wherein the tube guide is made of elastic material (because all materials have a modulus of elasticity, the tube guide is made of an elastic material).

4. Claims 4-6, 10 and 14, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Conant 2,882,742 in view of Merkel US 3,379,643, and

Art Unit: 3656

further in view of Rohlinger US 5,373,755, and further in view of Ebina et al. US 6,089,117.

Conant discloses all of the claimed subject matter as described above. Conant does not disclose wherein the scooping portion insertion hole has a ball circulation passage scooping angle set so as to correspond to the a lead angle of the ball screw.

Ebina et al. teach wherein the scooping portion insertion hole has a ball circulation passage scooping angle set so as to correspond to the a lead angle of a ball screw (see figure 8) for the purpose of achieving smooth circulation of balls (C16/L45-60).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the teachings of Conant and provide wherein the scooping portion insertion hole has a ball circulation passage scooping angle set so as to correspond to the a lead angle of a ball screw, as taught by Ebina et al., for the purpose of achieving smooth circulation of balls.

Conant further discloses:

- wherein the tube guide is made of elastic material (because all materials have a modulus of elasticity, the tube guide is made of an elastic material).

5. Claims 28 and 29, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Conant 2,882,742 in view of Merkel US 3,379,643, and further in view of Rohlinger US 5,373,755.

Art Unit: 3656

Conant discloses all of the claimed subject matter as described above. Conant does not disclose a chamfered top surface.

Rohlinger teaches a chamfered top surface (see figures 4 and 6 @ 41) for the purpose of closely supporting a circulation tube while allowing for a radius to smoothly guide balls (C6/L55-65), thus avoiding an abrupt change in ball direction and improving operational efficiency.

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the teachings of Conant and provide a chamfered top surface, as taught by Rohlinger, for the purpose of closely supporting a circulation tube while allowing for a radius to smoothly guide balls, thus avoiding an abrupt change in ball direction and improving operational efficiency.

Response to Arguments

6. Applicant argues "However, neither JP '051 or Conant disclose or suggest this recitation. Specifically, JP '051 and Conant both have a step like portion towards the bottom of the hole and do not have a through hole which has a uniform cross section all the way through the entire depth of the hole. Also, neither Rohlinger, Merkel, or Ebina cure this deficiency. Specifically, none of the cited references show a hole which has a uniform cross section all the way through the entire depth of the hole. Also, none of the cited references disclose any advantages to being able to use an ordinary machining tool in order to be able to machine the tube guide insertion hole".

In response, it is submitted that the limitation being argued is indefinite as discussed above. Specifically, it appears as if applicants own invention does not have

Art Unit: 3656

the instant feature being claimed. The examiner asserts, that the amended claims has misconstrued the structure of the instant invention based upon applicants' figures 1 and 3. However, as can be seen in applicants' figure 4, the shape of tube guide 10 corresponds to the shape of tube guide insertion hole 9. It can also be seen that from this angle, that is to say, an axial view, the tube guide insertion hole would have a **unequal** cross section as outlined by applicants' figure 4d.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TERENCE BOES whose telephone number is (571)272-4898. The examiner can normally be reached on Monday - Friday 9:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on (571) 272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 3656

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Terence Boes/
Examiner, Art Unit 3656

/William C. Joyce/
Primary Examiner, Art Unit 3656